

**THE FLORISTICS OF CALCAREOUS PRAIRIES ON THE KISATCHIE  
NATIONAL FOREST, LOUISIANA.**

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ABSTRACT

The floristics and edaphic factors of central Louisiana calcareous prairies are described. In presettlement times, prairies were fairly common and widely distributed in central and north Louisiana but because of anthropogenic disturbances only a few remnants remain.

KEY WORDS: Prairie, Kisatchie National Forest, floristics, Louisiana

INTRODUCTION

While the disappearance of prairies from the midwest over the past two centuries is well documented (Axelrod 1985; Smeins & Diamond 1986; Sims 1988; Kucera 1992; Smeins, *et al.* 1992), their occurrence in and disappearance from the southeastern United States is not well documented (DeSelm & Murdock 1993). In presettlement times there were numerous fairly large prairies scattered across northern and central Louisiana (Lockett 1969; Flores 1984; Smith, *et al.* 1989; Teague & Wendt 1994; MacRoberts & MacRoberts 1995a) but because of anthropogenic activities, these have almost vanished.

In Louisiana the community is ranked as critically imperiled (Smith, *et al.* 1989). Prairies provide critical refugia for many rare species, adding significantly to the diversity of the area.

Some of the most intact prairies in Louisiana occur on the Kisatchie National Forest, notably in the Winn Ranger District in Winn and Grant parishes (Smith, *et al.* 1989; MacRoberts & MacRoberts 1995b, 1996). These prairies represent the best chance for preserving this unique natural community in Louisiana.

In this paper we report on the floristics and edaphic factors of the prairies on the Winn District of the Kisatchie National Forest in Winn Parish.

## METHODS

The Keiffer Prairies comprise a group of about 45 openings in calcareous forest extending approximately 14 km northeast and southwest of Calvin in eastern Winn Parish (Smith, *et al.* 1989; MacRoberts & MacRoberts 1996). The name comes from John Keiffer, an early settler, and is applied collectively to the entire group of prairies near Calvin. Located in T11N R4W Secs. 7, 8, 18; T11N R5W Secs. 13, 23-26, 35; T12N R4W Secs. 33-35, these prairie openings range in size from about 0.1 ha. to ten hectares. The largest prairie straddles Forest Service and private land. Collectively, the Keiffer Prairies total about 70 ha. (Smith, *et al.* 1989).

Five additional prairies occur in nearby northern Grant Parish and in southeastern Winn Parish. These we will refer to collectively as the Packton Prairies. These or closely associated prairies are probably the prairies originally described by Lockett (1969: 72) as Bertram's or Tancock's prairies. Three are in T9N R3W Secs. 2 and 10 (Winn Parish), and two are in T9N R2W Secs. 5 and 6 (Grant Parish). These five prairies range in size from about 0.2 ha. to 4.0 ha. The largest straddles Forest Service land. They total about 12 ha. (MacRoberts & MacRoberts 1996).

The prairies all have been heavily grazed in the past; a few have been farmed, at least for short periods (Smith, *et al.* 1989). Because of downed fences one of the prairies was still heavily grazed in 1996.

We selected two of the Keiffer Prairies (Milam Branch and Coldwater) as representative examples for a detailed floristic inventory and visited them every two to three weeks between the spring of 1996 and the fall of 1996. Milam Branch Prairie is one of the more northern of the Keiffer group and Coldwater is one of the more southern. They are about 6.5 km apart.

Milam Branch Prairies consists of two sections. We surveyed the smaller, western section (about 1.2 ha., T11N R4W Sec. 7). Coldwater Prairie also consists of two sections. We surveyed the smaller southern section (ca. 1.6 ha., T11N R5W Sec. 26). The study sites are about 70 meters above sea level.

During these visits we collected or recorded all vascular plants encountered and took soil samples for analysis.

We had visited these and other Keiffer Prairies regularly since 1994, notably as part of a survey for rare plant species on the Kisatchie National Forest (MacRoberts & MacRoberts 1995b), and we were familiar with the entire group when the 1996 survey began. In the late 1980's the Louisiana Natural Heritage Program made the first preliminary survey of the Keiffer prairies and visited some of them (Smith, *et al.* 1989).

In 1996 we visited every prairie to check on their condition (woody encroachment, ground disturbance) and to make brief floristic surveys (MacRoberts & MacRoberts 1996). Because a number of plants are fidel to prairies and therefore are very rare in Louisiana, a special effort was made to look for rare species.

Prairies have a distinctive signature on aerial photographs. Consequently, aerial photographs and previous survey maps made locating prairies easy.

Annual precipitation averages about 125 cm and is fairly evenly distributed throughout the year. In summer, temperatures rise to 35° C; this, combined with short droughts, translates into very hot and dry conditions especially in open areas.

Under drought conditions the calcareous soils tend to dry, forming wide cracks. When wet, these soils are very sticky. In all the prairies we have examined, small calcareous concretations are common.

Voucher specimens are deposited in VDB, SFRP, LSU, LSUS, NLU, and BRCH. Nomenclature mostly follows Kartesz (1994).

Soil samples taken from the upper 15 cm of the prairies were analyzed by A. & L. Laboratories, Memphis, Tennessee.

## RESULTS

Table 1 lists the vascular plants found in Milam Branch and Coldwater prairies. The letter "M" following the species indicates presence at Milam Branch, "C" indicates presence at Coldwater, and no letter presence at both prairies.

Table 2 gives information on the soil characteristics of Milam and Coldwater prairies.

These rather neutral soils are high in calcium and very low in other nutrients. Further information on prairie soils is given in our previous paper (MacRoberts & MacRoberts 1995a; see also Smith, *et al.* 1989).

## DISCUSSION

We recorded 137 species, representing 107 genera and 44 families for the two prairies. Milam Branch had 100 species, 82 genera, and 39 families. Coldwater had 124 species, 99 genera, and 41 families. This makes these prairies as species rich as other similar sized plant communities in the region, for example, bogs (MacRoberts & MacRoberts 1993). Grasses, composites, and legumes dominate, making up 46% of the species total. Sorensen's Index of Similarity indicates that Milam and Coldwater prairies are vegetationally the same (IS = 78).

Table 1. Vascular plants at two prairies.

ACANTHACEAE - *Ruellia humilis* Nutt.

AGAVACEAE - *Manfreda virginica* (L.) Salisb. ex Rose.

ANACARDIACEAE - *Rhus copallinum* L., *Toxicodendron radicans* (L.) Kuntze.

ANNONACEAE -- *Asimina triloba* (L.) Dunal.

APIACEAE - *Eryngium yuccifolium* Michx. (C), *Polytaenia nuttallii* DC. (C), *Zizia aurea* (L.) Koch (C).

AQUIFOLIACEAE - *Ilex decida* Walt., *I. vomitoria* Ait.

ASCLEPIADACEAE - *Asclepias tuberosa* L., *A. viridiflora* Raf., *A. viridis* Walt. (M).

ASTERACEAE - *Ambrosia psilostachya* DC., *Aster dumosus* L., *Aster oolentangiensis* Riddell, *Aster patens* Ait., *Aster sericeus* Vent., *Cacalia plantaginea* (Raf.) Shinners, *Cirsium horridulum* Michx., *Coreopsis lanceolata* L., *Echinacea pallida* (Nutt.) Nutt., *Erigeron strigosus* Muhl. ex Willd., *Eupatorium coelestinum* L., *Eupatorium semiserratum* DC. (C), *Gaillardia aestivalis* (Walt.) H. Rock., *Gnaphalium obtusifolium* L. (C), *Helenium autumnale* L., *Helianthus angustifolius* L. (M), *Helianthus hirsutus* Raf., *Iva annua* L. (C), *Liatris pycnostachya* Michx. (C), *L. squarrosa* Michx. (C), *Rudbeckia hirta* L., *R. subtomentosa* Pursh. (C), *Silphium laciniatum* L., *S. radula* Nutt. (C), *Solidago canadensis* L., *Solidago nitida* Torrey & A. Gray, *Solidago rigida* L. (C), *Vernonia missurica* Raf. (C).

BORAGINACEAE - *Heliotropium tenellum* (Nutt.) Torr., *Onosmodium hispidissimum* Mackenzie (C).

CAMPANULACEAE - *Lobelia appendiculata* A. DC., *Triodanis perfoliata* (L.) Nieuwl. (M).

CAPRIFOLIACEAE - *Lonicera japonica* Thumb. (M), *L. sempervirens* L. (M), *Viburnum rufidulum* Raf. (C).

CORNACEAE - *Cornus drummondii* C.M. Mey., *C. florida* L.

CUPRESSACEAE - *Juniperus virginiana* L.

CUSCUTACEAE - *Cuscuta cuspidata* Engelm.

CYPERACEAE - *Carex microdonta* Torrey & Hook., *Fimbristylis puberula* (Michx.) Vahl.

Table 1 (cont.)

EBENACEAE - *Diospyros virginiana* L.

EUPHORBIACEAE - *Chamaesyce nutans* (Lag.) Small (M), *Euphorbia bicolor* Engelm. & A. Gray (M).

FABACEAE - *Baptisia alba* (L.) Vent., *Cercis canadensis* L. (C), *Dalea candida* Willd., *Dalea purpurea* Vent., *Desmanthus illinoensis* (Michx.) MacM. ex B.L. Robins. & Fern. (C), *Galactia volubilis* (L.) Britt. (C), *Gleditsia triacanthos* L., *Mimosa strigillosa* Torrey & A. Gray (C), *Neptunia lutea* (Leavenworth) Benth.

GENTIANACEAE - *Sabatia angularis* (L.) Pursh (C), *S. campestris* Nutt.

HAMAMELIDACEAE - *Liquidambar styraciflua* L.

IRIDACEAE - *Nemastylis geminiflora* Nutt. (C), *Sisyrinchium campestre* Bickn.

LAMIACEAE - *Monarda fistulosa* L. (C), *Prunella vulgaris* L., *Pycnanthemum tenuifolium* Schrad., *Salvia azurea* Michx. ex Lam., *Salvia lyrata* L., *Scutellaria parvula* Michx. (C).

LILIACEAE - *Allium canadense* L., *Hypoxis hirsuta* (L.) Coville, *Nothoscordum bivalve* (L.) Britt., *Smilax bona-nox* L.

LINACEAE - *Linum sulcatum* Riddell.

LOGANIACEAE - *Cynoctonum mitreola* (L.) Britt. (M)

MALVACEAE - *Callirhoe papaver* (Cav.) A. Gray.

ONAGRACEAE - *Gaura longiflora* Spach.

ORCHIDACEAE - *Spiranthes magnicamporum* Sheviak.

PINACEAE - *Pinus echinata* P. Mill., *P. taeda* L.

PLANTAGINACEAE - *Plantago virginica* L. (C).

POACEAE - *Andropogon gerardii* Vitman (C), *Andropogon glomeratus* (Walt.) B.S.P., *Aristida longespica* Poir., *Aristida oligantha* Michx., *Aristida purpurascens* Poir., *Dichantherium aciculare* (Desv. ex Poir) Gould & C.A. Clark (C), *Eragrostis spectabilis* (Pursh) Steud., *Muhlenbergia capillaris* (Lam.) Trin., *Panicum anceps* Michx., *P. virgatum* L. (C), *Paspalum floridanum* Michx., *P. setaceum* Michx., *Schizachyrium scoparium* (Michx.) Nash, *Setaria geniculata* Beauv., *Sorghastrum nutans* (L.) Nash, *Sphenopholis obtusata* (Michx.) Scribn. (C), *Sporobolus asper* (Michx.) Kunth (C), *S. junceus* (Beauv.) Knuth, *Tridens flavus* (L.) Hitchc. (C), *T. strictus* (Nutt.) Nash (M).

Table 1 (cont.)

POLEMONIACEAE - *Phlox pilosa* L. (C).

PRIMULACEAE - *Lysimachia lanceolata* Walt.

RANUNCULACEAE - *Delphinium carolinianum* Walt., *Ranunculus sardous* Crantz.

RHAMNACEAE - *Berchemia scandens* (Hill) K. Koch, *Ceanothus americanus* L. (C).

ROSACEAE - *Agrimonia microcarpa* Wallr. (C), *Crataegus berberifolia* Torrey & A. Gray (C), *C. marshallii* Egglest. (C), *C. spathulata* Michx. (C), *Rubus* sp.

RUBIACEAE - *Diodia teres* Walt. (M), *D. virginiana* L. (M), *Hedyotis nigricans* (Lam.) Fosberg, *Houstonia purpurea* L. var. *calycosa* A. Gray.

SAPOTACEAE - *Bumelia lanuginosa* (Michx.) Pers.

SCROPHULARIACEAE - *Agalinis oligophylla* Pennell (M), *Buchnera americana* L. (C), *Gratiola neglecta* Torr., *Pedicularis canadensis* L., *Penstemon australis* Small, *Penstemon tubaeformis* Nutt.

SOLANACEAE - *Solanum carolinense* L. (M)

ULMACEAE - *Ulmus alata* Michx.

VALERIANACEAE - *Valerianella radiata* (L.) Dufur.

VERBENACEAE - *Glandularia canadensis* (L.) Nutt., *Verbena brasiliensis* Vell.

VITACEAE - *Ampelopsis arborea* (L.) Koehne (C)

Table 2. Soil characteristics of Milam and Coldwater prairies.

| Sample    | pH  | Exchangeable Ions (ppm) |     |      |    | OM% |
|-----------|-----|-------------------------|-----|------|----|-----|
|           |     | P                       | K   | Ca   | Mg |     |
| Coldwater | 7.4 | 1                       | 91  | 3980 | 73 | 3.2 |
| Milam     | 7.3 | 2                       | 132 | 4990 | 84 | 4.1 |

These prairies have their greatest resemblance to the tallgrass prairies of the midwest and to the blackland prairies of Arkansas, east Texas, Mississippi, and Alabama (Smith, *et al.* 1989; Smeins, *et al.* 1992; Smeins & Diamond 1986).

As part of this project, we visited every prairie opening during 1996. On these visits we noted details of floristics, rare species, and prairie condition. Almost without exception, all had surface damage ranging from fire lines to roads through them, some still in use and others with old logging roads. The major threat appears to be encroachment of eastern red cedar and other woody species into the prairies due to fire suppression. We also noted severe detritus buildup, which will ultimately shade out the smaller herbaceous species. This latter point should be emphasized. It is well known that detritus accumulation limits productivity of tallgrass prairies. While a prairie may look healthy because it has impressive stands of big bluestem, it may in fact be losing species diversity because of dense detritus accumulation close to the ground (Knapp & Seastedt 1986).

#### RARE SPECIES

The Louisiana Natural Heritage rare or watch lists (Louisiana Natural Heritage Program 1995) include fifteen prairie species occurring in the Keiffer and Packton prairies. These prairies have been botanized since the late 1930's, intensively so after the 1980's (Smith, *et al.* 1989). In this section we summarize the distribution of the species on the Louisiana Natural Heritage Plant List (LNHP) in the Keiffer and Packton prairies.

We will not repeat information contained in our previous paper on rare Kisatchie National Forest plants (MacRoberts & MacRoberts 1995b). That publication should be consulted for further information on each species, notably voucher specimens and precise locations.

Detailed maps of prairie species locations are on file with the Kisatchie National Forest (MacRoberts & MacRoberts 1996). We have no additional information on the following species: *Asclepias stenophylla* A. Gray., *Astragalus crassicaarpus* Nutt., *Carex meadii* Dewey, *Ceanothus herbaceus* Raf., *Euphorbia bicolor* Engelm & A. Gray, *Koeleria macrantha* (Lebed.) J.A. Schultes, *Panicum flexile* (Gatt.) Scribn., *Polygala verticillata* L., *Polytaenia nutallii* DC., and *Sporobolus ozarkanus* Fernald (MacRoberts & MacRoberts 1995b).

*Asclepias viridiflora* Raf. We have now recorded green milkweed -- LNHP watch list species -- for most of the Keiffer and Packton prairies. It probably occurs at least in all the larger ones. While frequently present, it is never common, often just a few individuals occurring in a prairie

*Carex microdonta* Torrey & Hook. Small-toothed sedge forms a major component of the herbaceous layer in all the Keiffer and Packton prairies.



*Heliotropium tenellum* (Nutt.) Torrey. Slender heliotrope occurs in almost all the Packton and Keiffer prairies, but for some reason is found in the central Keiffer prairies and not in the southern and northern ones.

*Houstonia purpurea* L. var. *calycosa* A. Gray. Purple bluet is found in almost all the Keiffer and Packton prairies.

*Spiranthes magnicamporum* Sheviak. (*MacRoberts & MacRoberts 2961* [LSU], 2963 [NYS], 2964 [LSUS], 2965 [SFRP], 2966 [DAO], 2967 [VDB]). Great Plains ladies-tresses was first found in the Keiffer prairies in 1995 (T11N R4W Secs. 7-8, T11N R5W Secs. 25-26, T11N R5W Sec. 35). Spot checks that winter located it in three Keiffer prairies but failed to locate it in the Packton prairies. The only other known Louisiana location for this species is a single site in Ouachita Parish (Louisiana Natural Heritage Program 1995). In October and November 1996, we located it in two additional Keiffer prairies (both in T11N R5W Sec. 24).

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